

**IN THE CLAIMS:**

Please add new claims 15-22 follows:

**LISTING OF CURRENT CLAIMS**

Claims 1-4. (Canceled)

Claim 5. (Original) A variable gain amplifier comprising:

a first stage operational amplification unit for providing a first gain, comprising:

a first input resistor coupled to an input signal;

an operational amplifier comprising:

5 a pre-drive stage coupled to the input resistor; and

a plurality of output stages, each output stage coupled to the pre-drive stage;

and

a plurality of first feedback resistors, each first feedback resistor being coupled to the pre-drive stage by one end thereof and coupled to one of the plurality

10 of output stages by another end thereof; and

a second stage operational amplification unit coupled to the first stage operational amplification unit, for providing a second gain;

wherein a first feedback loop is formed by one of the output stages chosen by a first control signal and the first feedback resistor corresponding to the chosen  
15 output stage, and a gain of the variable gain amplifier corresponds to the first and the second gain.

Claim 6. (Original) The variable gain amplifier of claim 5, wherein the second stage operational amplification unit comprises:

- 5 a plurality of second input resistors, each second input resistor being coupled to a corresponding first feedback resistor of the first stage operational amplification unit;
- a plurality of first switches, each first switch being coupled to a corresponding second input resistor;
- a second operational amplifier coupled to the plurality of first switches;
- 10 a plurality of second feedback resistors, being serial-connected with one another, being connected to the plurality of first switches by one end of the serial-connected second feedback resistors and an output of the second operational amplifier by another end thereof; and
- 15 a plurality of second switches, each second switch being coupled to the plurality of first switches by one end and to a corresponding second feedback resistor by another end.

Claim 7. (Original) The variable gain amplifier of claim 5, wherein the second stage operational amplification unit comprises:

- a plurality first switches, each first switch being coupled to a corresponding first feedback resistor;
- 5 a second input resistor coupled to the plurality of first switches;
- a second operational amplifier coupled to the second input resistor;
- a plurality of second feedback resistors, being serial-connected with one another, being connected to the second input resistor by one end of the serial-connected second feedback resistors and an output of the second operational
- 10 amplifier by another end thereof; and
- a plurality of second switches, each second switch being coupled to the second input resistor by one end and to a corresponding second feedback resistor by another end.

Claim 8. (Original) The variable gain amplifier of claim 5, wherein the first input resistor is coupled to the operational amplifier by way of an electrostatic discharge protection device.

Claim 9. (Original) The variable gain amplifier of claim 5, wherein each of the output stages further comprises:

a PMOS transistor, whereof a source is connected to a supply voltage;

an NMOS transistor, whereof a source is grounded and a drain is coupled to  
5 the PMOS transistor;

a first MOS switch coupled between the pre-drive stage and a gate of the NMOS transistor, a gate of the first MOS switch being coupled to the first control signal;

a second MOS switch coupled between the pre-drive stage and a gate of the  
10 PMOS transistor, a gate of the second MOS switch being coupled to a second control signal;

a third MOS switch coupled between the gate of the NMOS transistor and ground, a gate of the third MOS switch being coupled to the second control signal; and

15 a fourth MOS switch control between the gage of the PMOS transistor and the supply voltage, a gate of the fourth MOS switch being coupled to the first control signal;

wherein the second control signal is a complementary signal fo the first control signal.

20            Claim 10. (Original) The variable gain amplifier of claim 5, wherein each output stage further comprises:

- a PMOS transistor coupled to a supply voltage;
- an NMOS transistor coupled between the PMOS transistor and ground;
- a first switch;
- 25            a second switch;

wherein the first switch is used for connecting a gate of a PMOS transistor to the pre-drive stage when the first control signal is in a first state, and the second switch is used for connecting a gate of the NMOS transistor to the pre-drive stage when the first control signal is in the first state.

Claim 11. (Previously Presented) A variable gain amplifier comprising:

a pre-drive stage comprising a first input node for receiving a input signal;  
a plurality of output stages, wherein one of the output stages is selected by a control signal to couple to the pre-drive stage; and

5            a plurality of feedback impedance, each of the feedback impedances being coupled between the pre-drive stage and one of the output stages;

wherein the pre-drive stage comprising a first output node and a second output node, each of the output stages comprising a first input node, a second input node, and an output node, and each of the feedback impedance is coupled between  
10            the first input node of the pre-drive stage and the output node of the corresponding output stage; and

wherein the gain of the variable gain amplifier is determined according to one of the feedback impedances coupled to the selected output stages and the pre-drive stage.

Claim 12. (Canceled)

Claim 13. (Previously Presented) The variable gain amplifier of claim 11, wherein the first input node of the selected output stage is coupled to the first output node of the pre-drive stage and the second input node of the selected output stage is coupled to the second output node of the pre-drive stage.

Claim 14. (Original) The variable gain amplifier of claim 11, wherein the variable gain amplifier further comprising an input impedance coupled to the first input node of the pre-drive stage, wherein the gain of the variable gain amplifier is determined according to the input impedance and one of the feedback impedances coupled to the selected output stages and the pre-drive stage.

Claim 15. (New) A variable gain amplifier comprising:  
an input resistor;  
a pre-drive stage coupled to the input resistor;  
a plurality of feedback resistors, each feedback resistor coupled to the pre-drive  
5 stage at one end;  
a plurality of output stages, each output stage coupled to one of the feedback  
resistors at another end thereof, forming a plurality of feedback loops; and  
a plurality of switches, coupled to one of the feedback loops at one end, and the  
switches coupled to a later stage at another end;  
10 wherein one of the feedback loops is chosen by one of the switches.

Claim 16. (New) The variable gain amplifier of claim 15, wherein the input resistor is coupled to the operational amplifier by way of an electrostatic discharge protection device.

Claim 17. (New) The variable gain amplifier of claim 15, wherein each of the output stages further comprises:  
a PMOS transistor, whereof a source is connected to a supply voltage;  
an NMOS transistor, whereof a source is grounded and a drain is coupled to the  
5 PMOS transistor;  
a first MOS switch coupled between the pre-drive stage and a gate of the  
NMOS transistor, a gate of the first MOS switch being coupled to a first control  
signal;

10 a second MOS switch coupled between the pre-drive stage and a gate of the PMOS transistor, a gate of the second MOS switch being coupled to a second control signal;

a third MOS switch coupled between the gate of the NMOS transistor and ground, a gate of the third MOS switch being coupled to the second control signal; and

15 a fourth MOS switch coupled between the gate of the PMOS transistor and the supply voltage, a gate of the fourth MOS switch being coupled to the first control signal;

wherein the second control signal is a complementary signal of the first control signal.

Claim 18. (New) The variable gain amplifier of claim 15, wherein each output stage further comprises:

5 a PMOS transistor coupled to a supply voltage;  
a NMOS transistor coupled between the PMOS transistor and ground;  
a first switch;  
a second switch;

wherein the first switch is used for connecting a gate of the PMOS transistor to the pre-drive stage when a first control signal is in a first state, and the second switch is used for connecting a gate of the NMOS transistor to the pre-drive stage  
10 when the first control signal is in the first state.

Claim 19. (New) A variable gain amplifier comprising:

a pre-drive stage comprising a first input node for receiving an input signal;

a plurality of feedback elements with impedance are coupled to the pre-drive stage at one end;

5 a plurality of output stages, each output stage coupled to one of the feedback elements at another end thereof, forming a plurality of feedback loops; and

a plurality of switches, coupled to one of the feedback loops at one end, and the switches coupled to a later stage at another end;

10 wherein the gain of the variable gain amplifier is determined according to the on and off state of the switches.

Claim 20. (New) The variable gain amplifier of claim 19, wherein the pre-drive stage comprises a first output node and a second output node, each of the output stages comprising a first input node, a second input node, and a output node, and each feedback element is coupled between the first input node of the pre-drive stage and the output node of the corresponding output stage.

Claim 21. (New) The variable gain amplifier of claim 20, wherein the first input node of the selected output stage is coupled to the first output node of the pre-drive stage and the second input node of the selected output stage is coupled to the second output node of the pre-drive stage.

Claim 22. (New) The variable gain amplifier of claim 19, wherein the variable gain amplifier further comprises an input element with impedance coupled to the first input node of the pre-drive stage, wherein the gain of the variable gain amplifier is determined according to the input element and one of the feedback elements coupled to the selected output stages and the pre-drive stage.